

*Peterson 18**Serial No. 09/915,963*

7

8       wherein the at least one antenna element comprises a traveling wave antenna supporting a  
9       phase velocity greater than the speed of light and, wherein the antenna structure supports  
10      a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional  
11      three-dimensional beam pattern.

1           5.       (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2       at least one antenna element is positioned at an angle from the symmetrical ground plane.

1           6.       (Original) The antenna structure of Claim 5, wherein the angle is about 90  
2       degrees with respect to the x-, y- and z- axes.

1           7.       (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2       at least one antenna element is coupled with the symmetrical ground plane by means of an  
3       unbalanced impedance.

1           8.       (Original) The antenna structure of Claim 7, wherein the unbalanced  
2       impedance comprises a coaxial cable.

1           9.       (Original) The antenna structure of Claim 7, wherein a first conductor of  
2       the unbalanced impedance mechanically couples the at least one antenna element with the  
3       symmetrical ground plane.

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1        10. (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2 symmetrical ground plane is disk shaped.

1        11. (Canceled)

1        12. (Canceled)

1        13. (Currently Amended) An antenna structure comprising:  
2  
3            an array of at least two antenna elements, each antenna element having at least one  
4            taper;  
5  
6            a symmetrical finite ground plane;  
7  
8            and  
9  
10          an unbalanced impedance for coupling the array of at least two antenna elements  
11          with the symmetrical ground plane;  
12  
13          wherein at least one antenna element of the array comprises a traveling wave antenna  
14          supporting a phase velocity greater than the speed of light and wherein the taper of at least  
15          one antenna element of the array comprises a linear profile, a linear constant profile, a  
16          broken-linear profile, an exponential profile, an exponential constant profile, a tangential  
17          profile, a step-constant profile, or a parabolic profile.

1        14. (Currently Amended) An antenna structure comprising:

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3       an array of at least two antenna elements, each antenna element having at least one  
4       taper;

5

6       a symmetrical finite ground plane;

7

8                          and

9

10      an unbalanced impedance for coupling the array of at least two antenna elements  
11      with the symmetrical ground plane;

12

13      wherein at least one antenna element of the array comprises a traveling wave antenna  
14      supporting a phase velocity greater than the speed of light and wherein each antenna  
15      element of the array supports a cigar-like directional three-dimensional beam pattern and a  
16      butterfly wing-like directional three-dimensional beam pattern.

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15.     (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2       each antenna element of the array is positioned at an angle from the symmetrical ground  
3       plane.

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16.     (Original) The antenna structure of Claim 15, wherein the angle for each  
2       antenna element is about 90 degrees with respect to the x-, y- and z- axes.

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17.     (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2       the unbalanced impedance comprises a coaxial cable.

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1           **18.**   (Original) The antenna structure of Claim 17, wherein a first conductor of  
2   the unbalanced impedance mechanically couples each antenna element of the array with  
3   the symmetrical ground plane.

1           **19.**   (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2   the symmetrical ground plane is disk shaped.

1           **20.**   (Previously Presented) The antenna structure of Claims 13 or 14, further  
2   comprising a slow wave antenna to widen the directivity of the antenna structure.

1           **21.**   (Canceled)

1           **22.**   (Currently Amended) An apparatus comprising:  
2  
3        a transceiver; and  
4  
5        an antenna structure for radiating or capturing electromagnetic energy from or to  
6        the transceiver comprising:  
7  
8        at least one antenna element having at least one taper, the taper comprising  
9        a linear profile, a linear constant profile, a broken-linear profile, an  
10      exponential profile, an exponential constant profile, a tangential profile, a  
11      step-constant profile, or a parabolic profile;  
12  
13      a symmetrical disk shaped finite ground plane, the at least one antenna element  
14      being positioned at an angle from the symmetrical disk shaped finite ground plane;

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18           an unbalanced impedance for coupling the at least one antenna element  
19           with the symmetrical disk shaped finite ground plane;

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21           wherein the at least one antenna element comprises a traveling wave antenna supporting a  
22           phase velocity greater than the speed of light and wherein the at least one antenna element  
23           supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like  
24           directional three-dimensional beam pattern.

1           **23.** (Previously Presented) The antenna structure of Claim 22, wherein the  
2           angle is about 90 degrees with respect to the x-, y- and z- axes.

1           **24.** (Previously Presented) The antenna structure of Claim 22, wherein the  
2           unbalanced impedance comprises a coaxial cable.

1           **25.** (Previously Presented) The antenna structure of Claim 22, wherein a first  
2           conductor of the unbalanced impedance mechanically couples the at least one antenna  
3           element with the symmetrical ground plane.

1           **26.** (New) The antenna structure of Claim 20, wherein said slow wave antenna  
2           is positioned at a greater distance from said ground plane than said antenna elements.

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1           **27.**    (New) The antenna structure of **Claim 3, 4 or 22**, wherein the distance  
2    between the lower edge of said at least one antenna element and said ground plane is  
3    tapered.

1           **28.**    (New) The antenna structure of **Claim 13 or 14**, wherein the distance  
2    between the lower edge of each of said at least two antenna elements and said ground  
3    plane is tapered.